SUMMARY REPORT ON ELECTROMAGNETIC NOISE MEASUREMENT PROGRAM

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The present status of the National Bureau of Standards program is that many magnetic tapes of analog data have been recorded in four major mines. Each mine uses different types of equipment. In addition, some surface measurements of noise have been made at two additional mines.

Two types of recordings have been made: (1) broadband measurements for spectral plots and (2) narrowband measurements for amplitude probability density (APD) plots. Only data from one mine (Robena #4) has been processed and was presented at this workshop.

The short-term goals are: (1) finish processing data from the other mines, (2) establish or reduce measurement system uncertainties, (3) put Robena report into final form for distribution, and (4) hold a review to determine what has been done, to distribute and to interpret the preliminary data, and to determine what still needs to be done.

Long-term goals are: (1) complete final reports on each of the mine trips, (2) establish techniques for predicting noise in mines already visited and establish uncertainty bounds for these predictions, and (3) establish techniques for predicting noise in mines that have not been visited (but that use similar equipment to those visited) and also establish uncertainty bounds for these predictions.

Specific factors or formats to be presented include:

(A) For underground broadband measurements:
   1. 300 Hz to 100 kHz spectral plots
   2. 300 Hz to 384 kHz spectral plots
   3. 300 Hz to 192 kHz spectral plots
   4. 300 Hz to 6kHz (subject to change to 3 or 12 kHz) spectral plots

(B) For surface broadband measurements:
   1. 300 Hz to 6 kHz (or 12 kHz) spectral plots
   2. 300 Hz to 3 kHz spectral plots

(C) For underground narrowband measurements:
   1. APD plots at 12 frequencies from 10 kHz to 32 mHz of magnetic field strength
   2. R.M.S. and average values will be calculated based on time averaging for these plots

(D) Sample spectral measurements of:
   1. Roof-bolt voltages
   2. Trolley wire-to-rail voltages
   3. Phone line currents

Future efforts will be decided after data processing is completed.

Possible tasks are:

(1) Measurements in an all-AC mine
(2) Measurements in some typical hard-rock mines
(3) spectral measurements below 300 Hz (requested by Arnie Farstad)
(4) Time statistical presentations from existing data
(5) Development of noise prediction techniques and uncertainty bounds
(6) Determine technique for using copies of analog noise tapes for system tests.